

Amendments to the Claims

This listing of claims, if entered, will replace all prior versions and listings of claims in the above-identified application.

Listing of Claims

1. **(Currently Amended)** A method comprising:
in response to receiving, from an application, a write request to write data to a mirrored volume, a computer system generating first and second write transactions, wherein
the first write transaction comprises a first tag, and
the second write transaction comprises a second tag;
transmitting the first and second write transactions to first and second storage devices, respectively;
wherein the first write transaction further comprises data D to be written;
wherein the second write transaction further comprises data D to be written;
storing first write information in an entry of a first tag table, wherein the first write information comprises the first tag and an identity of a logical block of a first storage object mirror where data D is to be written, wherein the first tag table is stored in first memory;
storing second write information in an entry of a second tag table, wherein the second write information comprises the second tag and an identity of a logical block of a second storage object mirror where data D is to be written, wherein the second tag table is stored in second memory;
synchronizing the first and second mirrors after storing the first write information in the entry of the first tag table and after storing the second write information in the entry of the second tag table.
2. (Previously Presented) The method of claim 1 further comprising:
generating third and fourth write transactions, wherein the third and fourth write transactions comprise third and fourth tags, respectively;

transmitting the third and fourth write transactions to the first and second storage devices, respectively.

3. (Cancelled)

4. (Cancelled)

5. (Currently Amended) The method of claim 1 wherein:
the first write transaction comprises data D to be written to a range of logical blocks of the first storage-object mirror;
the second write transaction comprises data D to be written to a range of logical blocks of the second storage-object mirror.

6. (Currently Amended) The method of claim 5 wherein the first write information comprises an identity of the first storage-object mirror, and an identity of the range of logical blocks of the first storage-object mirror where data D is to be written, the second write information comprises an identity of the second storage-object mirror, and an identity of the range of logical blocks in the second storage-object mirror where data D is to be written.

7. (Previously Presented) The method of claim 1 further comprising comparing the contents of one entry in the first tag table with the contents of entries in the second tag table to determine whether the second tag table includes an entry that matches the one entry.

8. (Currently Amended) The method of claim 7 further comprising copying data, associated with the logical block number identified by the one entry, from the first storage-object mirror to the logical block in the second storage-object mirror if the second table lacks an entry with contents matching the contents of the one entry.

9. (Original) The method of claim 7 further comprising deleting the one entry in the first table if the second table contains an entry with contents that match the contents of the one entry.

10. (Original) The method of claim 9 further comprising deleting the entry in the second table with contents that match the contents of the one entry.

11. (Currently Amended) The method of claim 1 further comprising:
generating a write transaction to write data to a logical block of a data volume;
incrementing a counter in response to generating the write transaction request;
generating the first and second tags as a function of an output of the incremented counter.

12. (Previously Presented) The method of claim 1 wherein the first and second storage devices comprise first and second object storage devices, respectively.

13. (Currently Amended) The method of claim 1 wherein:
the first write transaction comprises data D to be written to an extension of the first storage object mirror;
the second write transaction comprises data D to be written to an extension of the second storage object mirror.

14. (Currently Amended) The method of claim 13 further comprising:
the first write information comprising an identity of the first storage object mirror,
and an indication that data D is to be stored in the extension of the first storage object mirror the second write information comprising an identity of the second storage object mirror, and an indication that data D is to be stored in the extension of the second storage object mirror.

15. (Currently Amended) A method comprising:
in response to receiving, from an application, a write request to write data, a computer system generating first and second write transactions;

wherein the first and second write transactions comprise first and second tags, respectively, wherein the first and second tags are identical to each other; transmitting the first and second write transactions to first and second storage devices, respectively;

wherein the first write transaction comprises data D;

wherein the second write transaction comprises data D;

storing first write information in an entry of a first tag table, wherein the first write information comprises the first tag and an identity of a logical block of a first ~~storage object mirror~~ where data D is to be written, wherein the first tag table is stored in first memory;

storing second write information in an entry of a second tag table, wherein the second write information comprises the second tag and an identity of a logical block of a second ~~storage object mirror~~ where data D is to be written, wherein the second tag table is stored in second memory;

synchronizing the first and second mirrors after storing the first write information in the entry of the first tag table and after storing the second write information in the entry of the second tag table.

16. (Currently Amended) The method of claim 1:

~~wherein a computer system generates the first and second write transactions in response to generation of a write transaction by a first application executing on the computer system, wherein the first and second tags are generated by a first tag generator;~~

a second computer system generating third and fourth transactions in response to generation of a write transaction by a second application executing on the second computer system;

wherein the third and fourth write transactions comprise third and fourth tags, respectively, wherein the third and fourth tags are generated by a second tag generator.

17. – 25. (Cancelled)

26. (Currently Amended) One or more computer readable mediums storing executable instructions executable, wherein a method is implemented in response to executing the instructions, the method comprising:

in response to receiving a first transaction comprising a first tag and data D, storing first write information in an entry of a first tag table, wherein the first write information comprises the first tag and an identity of a logical block of a first storage object mirror of a mirrored volume where the data D is to be written, wherein the first tag table is stored in first memory, wherein the first transaction is generated in-response-to-a-write-request from-an-application by a computer system;

in response to receiving a second write transaction comprising a second tag and data D, storing second write information in an entry of a second tag table, the second write information comprising the second tag and an identity of the logical block of a second storage object mirror of the mirrored volume where data D is to be written, wherein the second tag table is stored in second memory, wherein the second transaction is generated in-response-to-the-write-request-from-the-application by the computer system;

synchronizing the first and second mirrors after storing the first write information in the entry of the first tag table and after storing the second write information in the entry of the second tag table.

27. (Previously Presented) The method of claim 1 further comprising:
synchronizing said first and second storage devices in response to an entry of the first tag table not matching an entry of the second tag table.

28. (Previously Presented) A method comprising:
in-response-to-receiving, from-an-application, a write request to write data to a mirrored volume, a storage manager generating first and second write transactions;
generating first and second tags;
transmitting the first write transaction to a first storage device;
transmitting the second write transaction to a second storage device;

transmitting the first tag to the first storage device;
transmitting the second tag to the second storage device;
wherein the first write transaction comprises data D to be written;
wherein the second write transaction comprises data D to be written;
receiving the first write transaction at the first storage device;
receiving the first tag at the first storage device;
storing the first write information in an entry of a first tag table, wherein the write information comprises the first tag and an identity of a logical block of a first storage object mirror where data D is to be written, wherein the first tag table is stored in first memory;
receiving the second write transaction at the second storage device;
receiving the second tag at the second storage device;
storing the second write information in an entry of a second tag table, wherein the write information comprises the second tag and an identity of a logical block of a second storage object mirror where data D is to be written, wherein the second tag table is stored in second memory;
synchronizing the first and second mirrors after storing the first write information in the entry of the first tag table and after storing the second write information in the entry of the second tag table.

29. (Cancelled)

30. (Cancelled)

31. (Currently Amended) The one or more computer readable memories of claim 26 wherein:
the first write transaction comprises data D to be written to a range of logical blocks of the first storage object mirror;
the second write transaction comprises data D to be written to a range of logical blocks of the second storage object mirror.

32. (Currently Amended) The one or more computer readable memories of claim 31 wherein:

the first write information comprises an identity of the first storage object mirror, and an identity of the range of logical blocks of the first storage object mirror where data D is to be written;

the second write information comprises an identity of the second storage object mirror, and an identity of the range of logical blocks in the second storage object mirror where data D is to be written.

33. (Previously Presented)) The one or more computer readable memories of claim 26 wherein the method further comprises comparing the contents of one entry in the first tag table with the contents of entries in the second tag table to determine whether the second tag table includes an entry that matches the one entry.

34. (Currently Amended) The one or more computer readable memories of claim 33 wherein the method further comprises copying data, associated with the logical block number identified by the one entry, from the first storage object mirror to the logical block in the second storage object mirror if the second table lacks an entry with contents matching the contents of the one entry.

35. (Previously Presented) The one or more computer readable memories of claim 33 wherein the method further comprises deleting the one entry in the first table if the second table contains an entry with contents that match the contents of the one entry.

36. (Previously Presented) The one or more computer readable memories of claim 35 wherein the method further comprises deleting the entry in the second table with contents that match the contents of the one entry.

37. (New) The method of claim 1 further comprising:
generating a first token after the first information is stored in the entry of the first tag table, wherein the first token identifies the entry of the first tag table;

generating a second token after the second information is stored in the second tag table, wherein the second token identifies the entry of the second tag table; transmitting the first and second tokens to the computer system; in response to a second request to write data to the mirrored volume, the computer system generating third and fourth write transactions, wherein the third write transaction comprises a third tag and the first token, and the fourth write transaction comprises a fourth tag and the second token; transmitting the third and fourth write transactions to first and second storage devices, respectively;

deleting the entry of the first tag table in response to the first storage device receiving the first token;

deleting the entry of the second tag table in response to the second storage device receiving the second token.

38. (New) The one or more computer readable memories of claim 26 wherein the method further comprises:

generating a first token after the first information is stored in the entry of the first tag table, wherein the first token identifies the entry of the first tag table; generating a second token after the second information is stored in the second tag table, wherein the second token identifies the entry of the second tag table; transmitting the first and second tokens to the computer system; in response to receiving a third transaction comprising the first token, a third tag and data D2, deleting the entry of the first tag table, storing third write information in another entry of the first tag table, wherein the third write information comprises the third tag and an identity of a logical block of the first mirror where the data D2 is to be written, wherein the third transaction is generated by the computer system;

in response to receiving a fourth transaction comprising the fourth token, a fourth tag and data D2, deleting the entry of the second tag table, storing fourth write information in another entry of the second tag table, wherein the fourth write information comprises the fourth tag and an identity of

another logical block of the second mirror where the data D2 is to be written, wherein the fourth transaction is generated by the computer system.